



National Weather Service

Lightning Safety


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Lightning Safety Outdoors

Each year, about 400 children and adults in the U.S. are struck by lightning while working outside, at sports events, on the beach, mountain climbing, mowing the lawn or during other outdoor activities. About 80 people are killed and several hundred more are left to cope with permanent disabilities. Many of these tragedies can be avoided. Finishing the game, getting a tan, or completing a work shift aren't worth death or crippling injury.

- **All thunderstorms produce lightning and are dangerous.** Lightning kills more people each year than tornadoes.
- **Lightning often strikes as far as 10 miles away from any rainfall.** Many deaths from lightning occur ahead of the storm because people try and wait to the last minute before seeking shelter.
- **You are in danger from lightning if you can hear thunder.** If you can hear thunder, lightning is close enough that it could strike your location at any moment.
- **Lightning injuries can lead to permanent disabilities or death.** On average, 20% of strike victims die; 70% of survivors suffer serious long term effects.
- **Look for dark cloud bases and increasing wind.** Every flash of lightning is dangerous, even the first. Head to safety before that first flash. If you hear thunder, head to safety!
- **Blue Skies and Lightning.** Lightning can travel sideways for up to 10 miles. Even when the sky looks blue and clear, be cautious. If you hear thunder, take cover. At least 10% of lightning occurs without visible clouds in the sky.

The Single Most Dangerous Place

Outdoors is the most dangerous place to be during a lightning storm. When lightning is seen or thunder is heard, or when dark clouds are observed, quickly move indoors or into a hard-topped vehicle and remain there until well after the lightning storm ends. Listen to forecasts and warnings through NOAA Weather Radio or your local TV and radio stations. If lightning is forecast, plan an alternate activity or know where you can take cover quickly.

The U.S. lightning season is summer but lightning can strike year round! The Fourth of July is historically one of the most deadly times of the year for lightning. In summer, more people are outside, on the beach, golf course, mountains or ball fields. Outdoor jobs such as construction and agriculture, and outdoor chores such as lawn mowing or house painting are at their peak, putting those involved in danger.

Safety Rules

1. **Postpone activities promptly.** Don't wait for rain. Many people take shelter from the

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rain, but most people struck by lightning are not in the rain! Go quickly inside a completely enclosed building, not a carport, open garage or covered patio. If no enclosed building is convenient, get inside a hard-topped all-metal vehicle. A cave is a good option outside but move as far as possible from the cave entrance.

2. **Be the lowest point. Lightning hits the tallest object.** In the mountains if you are above treeline, you ARE the highest object around. Quickly get below treeline and get into a grove of small trees. Don't be the second tallest object during a lightning storm! Crouch down if you are in an exposed area.
3. **Keep an eye on the sky.** Look for darkening skies, flashes of lightning, or increasing wind, which may be signs of an approaching thunderstorm.
4. **Listen for the sound of thunder.** If you can hear thunder, go to a safe shelter immediately.
5. **If you see or hear a thunderstorm coming or your hair stands on end, immediately suspend your game or practice and instruct everyone to go inside a sturdy building or car.** Sturdy buildings are the safest place to be. Avoid sheds, picnic shelters, baseball dugouts, and bleachers. If no sturdy building is nearby, a hard-top vehicle with windows closed will offer some protection. The steel frame of the vehicle provides some protection if you are not touching metal.
6. **Listen to NOAA Weather Radio.** Coaches and other leaders should listen for a tone-alert feature during practice sessions and games.
7. **If you can't get to a shelter, stay away from trees.** If there is no shelter, crouch in the open, keeping twice as far away from a tree as it is tall.
8. **Avoid leaning against vehicles.** Get off bicycles and motorcycles.
9. **Get out of the water. It's a great conductor of electricity.** Stay off the beach and out of small boats or canoes. If caught in a boat, crouch down in the center of the boat away from metal hardware. Swimming, wading, snorkeling and scuba diving are NOT safe. Lightning can strike the water and travel some distance beneath and away from its point of contact. Don't stand in puddles of water, even if wearing rubber boots.
10. **Avoid metal!** Drop metal backpacks, stay away from clothes lines, fences, exposed sheds and electrically conductive elevated objects. Don't hold on to metal items such as golf clubs, fishing rods, tennis rackets or tools. Large metal objects can conduct lightning. Small metal objects can cause burns.
11. **Move away from a group of people.** Stay several yards away from other people. Don't share a bleacher bench or huddle in a group.

What to do if someone is struck by lightning:

- **Call for help.** Call 9-1-1 or your local ambulance service. Get medical attention as quickly as possible.
- **Give first aid.** If the victim has stopped breathing, begin rescue breathing. If the heart has stopped beating, a trained person should give CPR. If the person has a pulse and is breathing, address any other injuries.
- **Check for burns in two places.** The injured person has received an electric shock and may be burned. Being struck by lightning can also cause nervous system damage, broken bones, and loss of hearing or eyesight. People struck by lightning carry no electrical charge that can shock other people. You can examine them without risk.

Stay Informed About the Storm

Listen to NOAA Weather Radio or local media for the latest severe thunderstorm **WATCHES** and **WARNINGS**. Severe thunderstorms are those storms with winds in excess of 58 mph or hail larger than 3/4 inches in diameter. When conditions are favorable for severe weather to develop, a severe thunderstorm **WATCH** is issued.

Weather Service personnel use information from weather radar, satellite, lightning detection, spotters, and other sources to issue severe thunderstorm **WARNINGS** for areas where severe weather is imminent. *Remember, however, that ALL thunderstorms produce deadly lightning.*

Decision Tree for Personal Lightning Safety

by Richard Kithil (Founder & CEO, National Lightning Safety Institute)

NLSI recommends that all organizations prepare a Lightning Safety Plan and inform all personnel of its contents. In a sentence, lightning safety is "anticipating a high-risk situation and moving to a low-risk location." Lightning Safety Plans should be site-specific, but they all share a common outline:

1. Advanced warning of the hazard. Some options:

- 1.1 "If you can see it, flee it; If you can hear it, clear it."
- 1.2 TV Weather Channel; NOAA Weather Radio
- 1.3 Fancy lightning detectors; off-site meteorological services

2. Make decision to suspend activities and notify people.

- 2.1 The 30/30 Rule says to shut down when lightning is six miles away. Use a "flash to bang" (lightning to thunder) count of five seconds equals one mile (10 = 2 miles; 20 = 4 miles; 30 = 6 miles).
- 2.2 Notify people via radio, siren or other means.

3. Move to safe location.

- 3.1 A large permanent building or metal vehicle is best.
- 3.2 **Unsafe** places are near metal or water; under trees; on hills; near electrical/electronics equipment.

4. Reassess the hazard.

It's usually safe after no thunder and no lightning have been observed for thirty minutes. Be conservative here.

5. Inform people to resume activities.

Training in Lightning Safety can be provided by the National Lightning Safety Institute